

NATIONAL AIR INTELLIGENCE CENTER



THE COURSE OF THE FORMER SOVIET UNION'S
ASTRONAVIGATIONAL DEVELOPMENT (I)

DTIC QUALITY INSPECTED 1



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19960618 117

HUMAN TRANSLATION

NAIC-ID(RS)T-0084-96 2 April 1996

MICROFICHE NR: 96C000295

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English pages: 18

Source: Cama, China Astronautics and Missilery Abstracts,
Vol. 2, Nr. 3, 1995; pp. 15-18; 25-27

Country of origin: China

Translated by: SCITRAN

F33657-84-D-0165

Requester: NAIC/TASS/Scott D. Feairheller

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THE COURSE OF THE FORMER SOVIET UNION'S ASTRONAVIGATIONAL DEVELOPMENT (I)

EDITORIAL NOTE: In recent years, the western press has revealed a great deal behind the scenes of the development of astronavigational technology in the former Soviet Union. Recently, they have also begun to carry out a new evaluation with regard to the course of astronavigational development in the former Soviet Union. In the past, organizational structures associated with astronavigational activities in the former Soviet Union have been relatively secret all along. People knew very little with respect to the command systems associated with the former Soviet Union's space projects. Normally, one relied on guesses and analysis. There was a lack of a foundation of reliable facts. However, recently published former Soviet and Russian official references have filled in the gaps in this area. Beginning with this number, this magazine will publish by decade, one after the other, the state of relevant areas associated with the astronavigational development of the former Soviet Union in order to provide readers a reference.

THE 40'S TO THE 50'S

As far as the political system of the former Soviet Union is concerned, in nominal terms, the Communist Party and the government of the Soviet Union are two independent organizations. However, in reality, policy guidance associated with national defense planning and astronavigational projects came directly from the top leadership of the Communist Party of the Soviet Union. Directives promulgated by the upper layers of the Communist Party of the Soviet Union were carried out as responsibilities of the different departments of the government--for example, various departments, general management authorities, national committees, and so on. In reality, due to the fact that the upper level leadership of a good number of government departments were also, at the same time, high level party officials, this set of leadership systems, therefore, operated very smoothly.

This organizational structure of the Communist Party of the Soviet Union normally began from the presidium (later called the politburo) of the National Defense Committee or the secretariat. In the secretariat, there was normally one person responsible for national defense and astronavigational affairs. The management apparatus one level lower was the central committee. In it, the national defense industry department managed astronavigation projects. Directives went through this level of organization and were transmitted to the leadership responsible for the various departments of the government to carry out plans which were already precisely stipulated.

1. The Area of Government Organizations

After the end of the Second World War, the former Soviet Union immediately began to carry out technological preparations and organizational work for space projects. At that time, the government of the former Soviet Union carried out a feasibility study on a super long range rocket to act as one part of the national defense plan.

On 13 May 1946, the government of the former Soviet Union

signed the first order to develop ballistic missiles. The missile industry began to turn into a special part of "machine building". This was an indirect formulation often used by the former Soviet Union with regard to the industries related to national defense.

In August 1946, the former Soviet Union set up weapons department scientific research institute No.88 (NII-88) to engage in the development of jet armament. Its location was put at Jialininggele (phonetic) close by Moscow. The weapons department chief, Wusilinofu (phonetic), oversaw the organizational work as a whole. Specific matters were primarily the responsibility of his assistant, Liyabikefu (phonetic). Most of the ballistic missile research work in the early period was concentrated in the No.88 scientific research institute. It is said that the organization in question was capable of not going through normal channels, reporting directly to Stalin as well as leadership above the department chief. The first chief of the No.88 scientific research institute was Genoer (phonetic). He had been a leader in a large model gun factory. The chief engineer was Bobieduonosicaifu (phonetic). He was a missile engineer who had just been turned over to the newly established national defense industry research institute.

The No.88 scientific research institute set up three main departments in order to complete the work of designing and building ballistic missiles:

- (1) an experimental factory;
- (2) a specialized design bureau (SKB) composed of a number of units primarily engaged in missile design;
- (3) a set of scientific research branch organizations to carry out specialized research projects such as the study of materials, strengths, aerodynamics, engines, fuels, controls, test measurements, as well as telemetry, and so on.

The specialized design bureau was led by the chief engineer of the plant on the site of the No.88 scientific research institute, Teliteke (phonetic). Within the design bureau, the one responsible for long range missile work was Keluoliaofu (phonetic). He was the general engineer responsible for manufacturing ballistic missiles, whom Wusilinofu (phonetic) personally appointed on 9 August 1946. At that time, Keluoliaofu (phonetic) appointed a control systems specialist, Mishen (phonetic), to act as his first assistant. The design bureau in question finally developed into an independent design bureau. In conjunction with this, the principal development directions for a good number of years after the No.88 scientific research institute were determined. In August 1946, Keluoliaofu (phonetic) employed a total of 52 engineers at Jialininggele (phonetic), including designers who were famous later--for example, Mishen (phonetic), Qieertuo (phonetic), Wosikelixinsiji (phonetic), and so on.

In 1946, when the No.88 scientific research institute turned into the principal organization responsible for designing and test manufacturing long range missiles, there were still a number of other organizations playing important roles in astronavigational projects--for example, the No.885 scientific research institute

(NII-885) set up within the Soviet Union's communications equipment department. The research institute in question was led by Makeximofu (phonetic). Two general engineers were Piliujin (phonetic) and Liangzansiji (phonetic). They respectively led /16

the automatic control system office and the radio control system office. Besides this, there was also No.944 scientific research (NII-944), which was led by the general engineer Kuziniezuofu (phonetic). It mainly studied missile gyroscope systems. The general engineer Baerming (phonetic), who held a post in the special machinery design bureau of the former Soviet Union's machine and equipment building department, was responsible for designing and constructing ground equipment to support missile launches.

The most important single task in astronavigational technology is the designing and test manufacture of high thrust rocket engines. This work fell to the No.456 general design bureau (OKB-456) led by Gelushike (phonetic). Altogether, there were 25 scientific research institutes and design bureaus as well as 18 plants that participated in the development work associated with the former Soviet Union's first generation ballistic missile R-1 after the war. This missile was basically an improved model of a German A-4 rocket. In order to make the various dispersed departments turn into one highly efficient whole, Keluoliaofu (phonetic) organized a "general engineer committee" in order to facilitate being able to effectively resolve important scientific and technical problems. Initially, the committee included 6 important personages in long range ballistic missile development projects: Keluoliaofu (phonetic) (leader), Gelushike (phonetic), Piliujin (phonetic), Liangzansiji (phonetic), Baerming (phonetic), and Kuziniezuofu (phonetic). At the beginning, this committee was an informal one--independent in the scientific research institute organization. However, it finally developed to take on the responsibility of being the organization that did the management work for the former Soviet Union's early space activities. Its one clear advantage was that it kept away from the general management system of missile manufacturing enterprises, facilitating the carrying out of work faster and more effectively.

Because the No.88 scientific research institute was the initial organization responsible for long range missiles, within the weapons department, therefore, there was set up a specialized high level security organization named the No.7 general management authority, directly supervising development work associated with long range missiles. In the beginning, this management authority was led by Weituooshijin (phonetic). It was responsible for long range ballistic missile design, parts procurement, and production.

2. The Area of the Communist Party of the Soviet Union

Above, a newly set up missile organization in government departments was described. At the same time, the former Soviet Union also adopted a number of systematization measures in order to make high level Party organizations capable of precisely determining policy problems in order to control government

departments. In April 1947, an organization was set up named the No.2 specialized committee. It was subordinate to the politburo and was the first organization within the government of the former Soviet Union to directly carry out long range weapon development and management work. It was initially led by the politburo member Malinkov (at that time, the No.2 man). In Malinkov's hands, the assistant responsible for missile projects was weapons department chief Wusilinofu (phonetic). He was directly responsible within the government for the operations of missile development projects. Committee members later expanded to include high level Party representatives from various departments. These departments included the weapons department (subordinate NII-88), the communications equipment industrial department, the shipbuilding industry department, the machine and equipment building department, as well as the national defense department. Each department had jurisdiction over a scientific research institute participating in missile development, engaged in each item of specialized missile technology work.

3. The Area of Users

The main client of the missile industry was the national defense department of the former Soviet Union (also called the armed strength department MVS). However, based on materials currently in hand, it is possible to see that the national defense department got involved very little in the actual development and production of missiles. Moreover, it was by the artillery management directorate subordinate to the national defense department--through two important organizations--that there was actual participation in and management of rocket projects:

(1) No.4 Scientific Research Institute. This was a military research organization. It primarily studied missile weapon test measurement methods, checks upon delivery, storage, combat applications, and so on.

(2) A Rocket Unit Set Up on a Base. The former Soviet Union set up a national central test launch site in the vicinity of Kapusitingyaer garrison (phonetic).

In July 1946, within the military forces of the former Soviet Union, there was set up a rocket unit called "special mission brigade". Its commander was a Major General Teweilisiji (phonetic). In 1950, a new high level artillery command reserve unit--the No.23 special engineer brigade--was set up, led by General Geligeliyefu (phonetic). Lieutenant General Woziniuke (phonetic) was appointed as the first commander in chief of the launch test site. The national defense department put out a number of special requirements to carry out research within the No.4 scientific research institute, thus being able to influence the design and production of rockets. At the same time, special units organized on the launch base were responsible for firings of all experimental rockets. Therefore, the national defense department had important influence on the entire missile industry.

4. Related Departments

Following along with the appearance of nuclear weapons, the government of the former Soviet Union set up a special department

in order to manage strategic nuclear weapons. In the beginning, this organization was called the 1st management directorate. In June 1953, after a reorganization, it was designated as the medium machine building department. Its first leader was Maleishefu (phonetic). Only 6 months later, he was appointed as deputy chairman of the department chiefs' conference.

Although the physicist Sakarov was spoken of, Maleishefu (phonetic)'s duty was to build a military industry including within it missile technology. However, this organization seemed to be managing nuclear weapons projects even more, and management with regard to rocket projects was relatively scarce. It can be confirmed that, in the 1950's, these two projects had a good number of areas of overlap. Besides this, the technical indices specified by scientists of the 1st management directorate had relatively great influences with regard to the technical characteristics of the former Soviet Union's first intercontinental ballistic missile, the R-7.

THE 1950'S

After Stalin's death, there seemed to exist a transition period. Among the new leadership, there was not much understanding of the operations associated with strategic missile projects. This was perhaps partially due to the fact that the No.88 scientific research institute--in a good number of cases--reported directly to Stalin, going around the officials of the formal management system.

1. The Area of Scientific Research Organizations /17

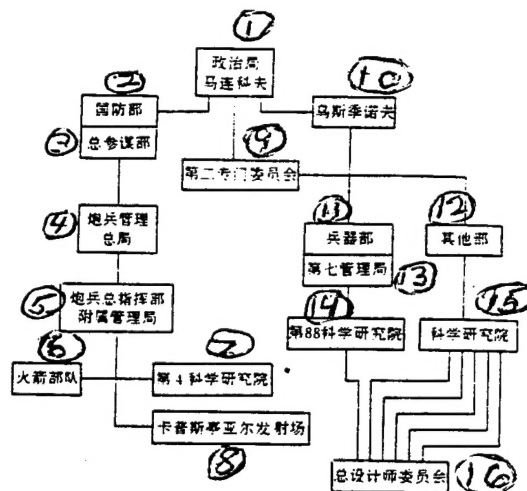
In 1955, the former Soviet Union's academy of sciences (AN-SSR) began to participate in the first artificial satellite project. In particular, it was this academy's deputy chief--the mathematician Keerdeshen (phonetic)--who played a very great role in precisely specifying the technical characteristics of the first satellite. On 30 August 1955, the academy in question set up a specialized science committee in order to study launch plans for the first satellite. On the basis of suggestions by the general engineer Keluoliaofu (phonetic), Keerdeshen (phonetic) was appointed as the first committee chairman. The committee in question as well as the departments that were later added in the early period of the development of astronavigational projects acted primarily as a consultative team to serve the government in order to coordinate space policy problems.

2. The Area of Government Organizations

The entire national defense industry of the former Soviet Union--including management work associated with early space activities--was the responsibility of the powerful national defense committee (VPK) organization. It primarily coordinated and managed all national defense industry related research, design, manufacturing, test measurements, and production activities. The military technology related departments set up in 1938 were all under the supervision and management of the national defense industry committee. Up to the end of the 1950's, the range of its

minister Wusilinnofu (phonetic), the national defense industry committee chairman, as well as the No.2 specialized committee, and finally to the newly installed leader of the former Soviet Union at that time, Krushev himself. In October 1957, after the launch of the former Soviet Union's first satellite, this type of management system changed to become more regular than other management forms. The launch of the first satellite gave rise to very great interest in Krushev with regard to space projects. He normally conferred personally with Keluoliaofu (phonetic) himself.

It seems that the general engineer committee not only produced influences with respect to space projects (this had already been sanctioned by Krushev). It also began to be capable of helping to bring about the receiving of approval by astronavigational programs, and, in conjunction with that, their implementation. In particular, this committee often passed a number of unofficial "resolutions" which possessed in all cases binding power with respect to all the scientific research units participating in space programs. The final approving authority for projects lay primarily in the hands of Krushev. He normally conferred in decisions with the national defense industry minister Wusilinnofu (phonetic).



Management System Associated with Space Activities of the Former Soviet Union in the 40's and 50's

Key: (1) Politburo Malinkov (2) Ministry of National Defense (3) General Staff Section (4) Artillery Management Directorate (5) Management Bureau Subordinate to the General Artillery Headquarters (6) Rocket Units (7) No.4 Scientific Research Institute (8) Kapusitingyaer (phonetic) Launching Site (9) No.2 Specialized Committee (10) Wusilinnofu (phonetic) (11) Weapons Department (12) Other Departments (13) No.7 Management Directorate (14) No.88 Scientific Research Institute (15) Scientific Research Institutes (16) General Engineer Committee

During the period 1957-1959, astronavigational and missile project management organizations within the government gave rise to further changes. At the end of 1957, Krushev started research and development (R&D) organizations for military scientific research departments to carry out reforms. The majority of research organizations, which were originally under the jurisdiction of various departments, were turned over to a national committee under the management of the Council of Ministers.

At the end of 1957, scientific research organizations subordinate to the national defense industry department were shifted to the new national defense technology committee (GKOT). In March 1958, the former national defense industry department deputy chief Ludeniefu (phonetic) was appointed as the national defense technology committee chairman. This organization was basically responsible for the duties of the former national defense industry department. The former No.7 management directorate was, in reality, also turned over to the jurisdiction of this organization. In 1957, Wusilinofu (phonetic) "moved up" to be national defense industry committee chairman, becoming Ludeniefu (phonetic)'s direct superior.

In 1957, a specialized committee was also set up in order to supervise and review the actual launch plans for the first satellite. This was none other than the national rocket testing and satellite launch committee. Liyabikefu (phonetic) served as chairman of the committee in question. He was also deputy chairman of the Russian Federated Republic council of ministers. This /21

newly established organization only carried out review and supervision with respect to rocket launch programs. It was not capable of participating in any policy making. This provisional transition structure had a reorganization of it carried out in 1958. It was redesignated as a national committee. Its powers were expanded to the day to day management of astronavigational programs.

These types of organizations--like national committees--were a relatively universal structure in the Soviet industrial circles of that time. Their primary duties were to precisely specify certain policies in order to guide the implementation of a number of important programs. Chairmen of national committees normally were a number of relatively outstanding personages in national defense departments.

Early in 1958, Ludeniefu (phonetic), who was already chairman of the national defense technology committee, was also appointed as the first chairman of the national space planning committee. These two departments looked to be the most powerful organizations in space programs. Ludeniefu (phonetic) not only engaged in day to day management work. He was also responsible for operations in the area of space program technology as chairman of the national defense technology committee. In conjunction with this, he reported directly to the national defense industry committee

chairman Wusilinofu (phonetic).

In 1960, the national space program committee was composed of 16 core members. The specific situation is seen in appended tables.

For several years after that, due to the requirements of a number of special flight missions, membership was expanded constantly--including in it a number of other designers and government officials.

3. The Area of the Communist Party of the Soviet Union

The national defense industry committee acted as the highest government administrative organ associated with national defense and space activities, maintaining direct contact with organizations of the Communist Party of the Soviet Union, which held real power. Under Krushchev, the leader in determining space policy may possibly have been Breshnev. In the period 1956-1960, he was central committee secretary, representing the Communist Party of the Soviet Union in the supervision and management of work in the areas of heavy industry, the construction industry, military equipment modernization, and space flight. In reality, Krushchev and Breshnev determined the course of Soviet astronavigational development in this period.

(Continued) (Draft supplied by An Jiaxin)

THE COURSE OF THE FORMER SOVIET UNION'S ASTRONAVIGATIONAL DEVELOPMENT
(II)

As far as the 1950's are concerned, the national defense industry committee of the former Soviet Union managed all military related industrial (including astronavigational project) research, design, manufacturing, test measurement, and production activities.

In conjunction with this, it maintained direct contact with the Communist Party of the Soviet Union. In this period, Krushchev and Breshnev basically determined the course of the astronavigational development of the former Soviet Union.

THE EARLY 60'S

1. The Area of Government Organizations

After the first flight of the Dongfang series spacecraft in 1961, Simiernofu (phonetic) became national committee chairman. In conjunction with this, at the same time, he was named as national defense technology committee chairman. It was one man in two posts. This not only clearly showed the importance with which Krushchev viewed space technology. It, moreover, clearly demonstrated several inherent relationships which existed between the management of space programs and the military.

In the same year, the government of the former Soviet Union passed directives precisely specifying the powers and position of the general designer committee. This clearly showed that--between Keluoliaofu (phonetic) and committees of various departments--contradictions had already begun to appear in terms of problems with general designer committee management and limitations on authority. New government decisions guaranteed the power of the committee in question. In the period of Krushchev's rule, the power of the general designer committee was very great. It normally jumped over the No.7 management directorate, the national defense technology committee, the national defense industry committee, the secretariat, the politburo, and finally went to Krushchev as the normal management system. Although the general designer committee had unofficial management channels, it had no power, however, to approve any projects. Normally, policy making depended on Krushchev's personal point of view.

In a few years after the Krushchev era, the individual impact of Wusilinofu (phonetic) in policy making associated with space and rocket programs began to gradually diminish. In March 1963, Wusilinofu (phonetic) was removed from the post of national defense industry committee chairman. The appointment was taken over by Simiernofu (phonetic). The post of national committee chairman, which Simiernofu (phonetic) took on, had already been taken over by Major General Qiulin (phonetic) at the end of 1962.

At the beginning of the 1960's, besides the 6 main design bureaus led by the various committee members of the general designer committee, there were at least 4 design bureaus which played major roles in the development of space technology:

- (1) The No.586 specialized design bureau was set up in 1952.

It was primarily engaged in the development of strategic missiles and military satellites. The general designer was Yanggeli (phonetic).

(2) As far as the No.52 design bureau was concerned, in 1959, it was subordinate to the aviation industry department. In the 1960's, it began to engage in research on new models of carrier rockets and spacecraft. The general designer was Qienomei (phonetic).

(3) The design bureau set up in 1951 with the general designer Kesibeige (phonetic) studied upper stage rocket engines.

(4) The No.2 specialized design bureau primarily designed and manufactured spacecraft engines. The general designer was Yisayefu (phonetic).

2. The Area of the Communist Party of the Soviet Union
Before 1960, Bolieerniefu (phonetic) was the high level official managing space projects within the Communist Party of the Soviet Union. Later, his duties turned toward other areas. During the organizational restructuring of March 1963, Breshnev again became the actual leader for space and missile programs. In conjunction with this, he was in the post right through until October 1964 (occurrence of changes in the highest leadership levels).

THE MIDDLE 60'S

1. The Area of Government Organizations

In October 1964, after Breshnev and Kosygin took supreme power, a most thorough going examination was carried out with regard to the management systems of space programs. Part of the reason was that rapid increases in the astronavigational activities of the former Soviet Union required the implementing of a completely new organization. After this examination, in March 1965, a thorough reorganization was done of the No.7 management directorate within the national defense technology committee, setting it up afresh. In conjunction with this, it was named the universal machine building department of the Soviet Union and given greater managerial jurisdiction.

The universal machine building department directly managed almost all the former Soviet Union's missile and astronavigational industry (see Fig.1). The former member of the central committee of the Communist Party of the Soviet Union, Afanaxiyefu (phonetic), was appointed as the first department chief of this organization. Simiernofu (phonetic) who began to serve as national defense industry committee chairman in 1963, then, became Afanaxiyefu (phonetic)'s direct superior.

Due to the fact that the national defense industry committee played a major role in reviewing the budgets of all military projects (including the universal machine building department), Simiernofu (phonetic) strove to expand influence in order to raise funds for the space program. The national defense industry committee seemed all along as though it were a subordinate organization of a ministerial committee. Simiernofu (phonetic)

reported directly to the Premier.

The newly established universal machine building department had 4 "primary production groups" responsible for development work in the 4 areas below:

- (1) strategic missiles and spacecraft;
- (2) boosters;
- (3) guidance systems;
- (4) ground support equipment.

The universal machine building department managed almost all scientific research institutes and design bureaus participating in space programs. Among these, the No.52 design bureau led by Qieluomei (phonetic) was originally subordinate to the aircraft production department. At this time, it also was turned over to the management of the universal machine building department. The No.88 scientific research institute which had previously managed/26 the No.1 design bureau was also renamed as the machine construction central research institute, belonging to the universal machine building department. This new organization retained the original personnel and large quantities of equipment, playing an important role in a number of new projects.

The universal machine building department also replaced the nomenclature of a number of organizations. The No.1 experimental design bureau led by Keluoliaofu (phonetic) changed its name to the experimental machine building central design bureau. The No.52 design bureau led by Qieluomei (phonetic) changed its name to machine building central design bureau.

The universal machine building department was authorized to recommend to the Council of Ministers candidates for bureau chiefs of design bureaus. After Keluoliaofu (phonetic) died in January 1966, Mishen (phonetic) was appointed as the leader of the No.1 design bureau which was nothing else than the exercise of this power.

As far as the universal machine building department was concerned, although it was nominally responsible for managing the entire astronavigational program of the former Soviet Union, its jurisdiction, however, was normally limited to item production and program guidance. For example, the universal machine building department constructed ground facilities for certain special engineering items. However, operation and management would then shift over to the space systems management directorate (unofficially called the strategic rocket unit space department).

The space systems management directorate was very active in the former Soviet Union's rocket launch activities. In 1966 (or 1968), it became a formal department of the strategic missile units. The installations which the space systems management directorate managed included three launch centers and all the space system ground facilities of the former Soviet Union (excluded aircraft with human pilots and weather and scientific satellites). However, the universal machine building department actually managed a flight control center. This center controlled all manned flight missions.

Early warning and certain monitoring satellites were under the

management of the air force (subordinate to the ministry of national defense). However, all reconnaissance satellites were under the control of the ministry of national defense general staff intelligence management directorate and the naval intelligence bureau. The primary influence of the air force on astronavigational activities was through the management of space flight personnel training center facilities. This center was set in the vicinity of Moscow. The air force had an important influence on the selection of space flight personnel.

(17) National Defense Department Astronavigational Units
 (18) Qiulatan (phonetic) Puliexieci (phonetic)
 Kapusitingyaer (phonetic) (19) Flight Control Center (20)
 National Air Defense Forces (21) Scientific Research Institutes
 (22) Scientific Research Institutes (23) Space Research
 Institute (24) General Designer Committee (25) Design Bureaus
 (26) Keluoliaofu (phonetic) Gelushenke (phonetic) Piliujin
 (phonetic) Liangzansiji (phonetic) Baerming (phonetic)
 Kuziniecuofu (phonetic) (27) Design Bureau (28) Other Research
 Institutes (29) Design Bureaus (30) Yisayefu (phonetic)
 Kesibeige (phonetic) Babajin (phonetic) Yanggeli (phonetic) and
 so on

2. The Area of the Communist Party of the Soviet Union

After Krushev's fall from power, Wusilinofu (phonetic) became an alternate committee member of the presidium (politburo) in 1965.

Moreover, he was still secretary of the central committee secretariat--specializing in national defense industry duties. He became the contact man between Simiernofu (phonetic), Afanaxiyefu (phonetic), and General Secretary Breshnev. In the area of space program management, Breshnev gave Wusilinofu (phonetic) very great powers. This was quite different from the Krushev era (Krushev himself had a very great interest in space programs).

Another important personage in the management of astronavigation was Xieerbin (phonetic). Beginning in 1958, he was none other than the person responsible for the central committee national defense industry bureau. It can be seen that Wusilinofu (phonetic) acted as the central committee secretariat member who supervised and managed national defense affairs. However, Xieerbin (phonetic) was only the head of a department subordinate to the central committee. It was very clear that Wusilinofu (phonetic) acted as the Party's highest level leader, controlling Xieerbin (phonetic). Thus, it was possible to recognize that--from the middle 1960's--Wusilinofu (phonetic) was none other than the actual leader for space programs. In conjunction with this, he held the post until 1976.

THE 1960'S MANAGEMENT SYSTEM

After the establishment of the universal machine building department, the general designer committee seems to have reduced direct contact with the Kremlin--in particular, after the death of Keluoliaofu in 1966. However, this organization still had quite great power and influence. The reason was that a good number of important projects in space activities came out of resolutions of this committee. General design committee resolutions were normally passed unanimously. These resolutions had deliberations on them carried out by the Academy of Sciences No.1 Specialized Committee. The person primarily in charge was the head of the Academy, Keerdeshen (phonetic). He had great influence on project design right along. Sometimes the Academy of Sciences carried out

modifications with regard to committee proposals, making them satisfy the requirements of space technology development. Besides this, it was also necessary to consider national science and technology committee opinions. This was the highest governmental structure for managing science in the former Soviet Union. After that, the machine building central research academy subordinate to the universal machine building department carried out deliberations on and passed relevant projects. In conjunction with this, it acted as one part of the annual space program. A team associated with the universal machine building department then carried out deliberations on projects. Representatives coming from other organizations and scientific research departments were also able to participate in relevant program work.

Subsequent to that, the universal machine building department would pass the budget request. In conjunction with this, in May of the next year, it was submitted to the national defense industry committee. The final fate of relevant projects was decided by the national defense industry committee. Generally, the national defense industry committee would readjust the budget requests on the basis of their own policies. After relevant projects were approved through the national defense industry committee, they were signed into law by the chairman of the Soviet presidium and approved for implementation.

The role of the former Soviet Union's national science and technology committee was primarily to guarantee the smooth implementation of programs and was not to determine any policy questions. Beginning in 1965, the committee in question was led by Kelimofu (phonetic). However, he certainly did not resemble his predecessor, who simultaneously took on the responsibility of being chairman of the national defense technology committee that way. Therefore, his management jurisdiction was relatively reduced. Part of the reason also lay in the establishment in 1965 of the universal machine building department and the appointment of Afanaxiyefu (phonetic). However, Kelimofu (phonetic) was still responsible for launch control, the selection of astronavigational personnel, launch preparation operations, as well as flight missions and equipment disposition. These were all key parts of the space program.

Of course, this is a conventional management system set. However, political changes would often alter or circumvent this set of predetermined management systems. The individual relationships between Keluoliaofu (phonetic), Qieluomie (phonetic), Yangeli (phonetic), Gelushenke (phonetic), and former Soviet leaders played a more important role than formal budget review and approval procedures. The former Soviet government would often promulgate a resolution associated with a special target for relevant space programs and then have different design bureaus compete for this project. This is similar to competitions between U.S. prime contractors. Final selections often stemmed from political considerations. In conjunction with this, they were related to relationships between Afanaxiefu (phonetic), Xieerbin (phonetic), and Wusilinofu (phonetic).

Attention should also be paid to the fact that the former national defense industry department of the central committee of the Communist Party of the Soviet Union had great influence on the entire review and approval process. The national defense industry committee and the universal machine building department very seldom vetoed a decision made the national defense industry department. After final adoption of a program, the government would promulgate a complete time table for the project. The general designer committee combined with the national committee to strive to coordinate the various types of resources of the the universal machine building department in order to satisfy the requirements of the pace.

The unsuccessful project by the former Soviet Union to land a man on the moon was nothing other than a case of this type of management system. In August 1964, the government of the former Soviet Union promulgated a resolution to prepare and develop a moon landing program. Three of the most powerful design bureaus

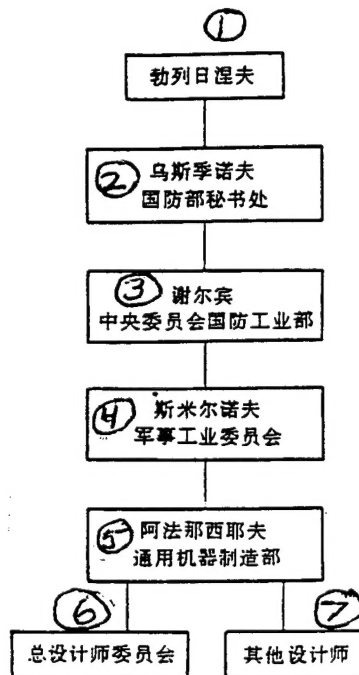


Fig.2 Space Activities Management System of the Former Soviet Union 1965-1976

Key: (1) Breshnev (2) Wusilinofu (phonetic) Ministry of National Defense Secretariat (3) Xieerbin (phonetic) Central Committee National Defense Industry Department (4) Simiernofu (phonetic) Military Industry Committee (5) Afunaxiyefu (phonetic) Universal Machine Building Department (6) General Designer Committee (7) Other Designers

(Keluoliaofu [phonetic], Qieluomei [phonetic], and Yanggeli [phonetic]) put forward competitive plans. A committee of the Academy of Sciences deliberated on these programs. In conjunction with this, the Keluoliaofu (phonetic) project was finally approved in November 1966. After that, in February 1967, the government of the former Soviet Union issued a decree which carried with it a concrete time table. What needs to be stressed is that--during the examination and approval process--each space project had its own unusual situations. The moon landing program was a classic case of a project promulgation process.

This kind of retransform organizational structure from the former Soviet Union persisted almost to the end of the 1980's. Although there were constant changes of personalities in space activities, the basic nature of the management structure, however, did not change--right up to the disintegration of the Soviet Union at the end of 1991.

What is always debated now is whether or not the system of concentration of power at the center speeded up the development of space technology in the former Soviet Union. The facts clearly show that, even though the management system for the former Soviet Union's space program was clearly a bureaucratic one, the former Soviet Union was still the most advanced nation in the area of astronavigational technology in the late 1950's and early 1960's.

(Draft provided by An Jiabin.)

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